CLAIMS

Subt B1

1. A method for generating a gene library from an environmental pool of organisms, which gene library is enriched in DNA encoding a polypeptide with an activity of interest, which method comprises:

a) subjecting the environmental pool of organisms to cultivation in a medium and/or under conditions suitable for enriching said pool of organisms in organisms harbouring said DNA; and

b) preparing a gene library from the resulting enriched pool of organisms.

2. The method according to claim 1, wherein the medium contains a substrate for the gene product encoded by said DNA.

3. The method according to claim 2, wherein the substrate constitutes the carbon source and/or nitrogen source of the medium.

Sub a2

4. The method according to claim 2 or 3, wherein the substrate comprises pectin, amylose, cellulose, galactose, xylose or arabinose or a combination thereof.

Subt B3

5. The method according to claim 1, wherein the enrichment is achieved by one or more growth restrictions.

6. The method according to claim 5, wherein the growth conditions comprise pH and temperature.

Sub a3

7. The method according to claim 1-6, wherein the growth conditions of step a) used for achieving the enrichment are pH 9-11 and temperature 50-70°C.

8. The method according to claim 1, wherein the environmental pool of organisms is isolated from an animal stomach or an insect gut.

9. The method according to claim 8, wherein the pool of microorganisms is isolated from a cow's rumen.

10. The method according to claim 8, wherein the pool of microorganisms is isolated from the gut of an insect of the Isoptera, Lepidoptera, Coleoptera, or Diptera families.

11. The method according to claim 10, wherein the pool of microorganisms is isolated from the gut of insects selected from the group consisting of *Agrotis, Neotermes castaneus, Tineola bisselliella,* and *Melolontha vulgaris.*

12. The method of any of claims 8 to 11, wherein the pool of microorganisms is enriched by supplying feed to the animal or insect, which comprises a substrate for the polypeptide with an activity of interest.

13. The method according to claim 1, wherein the gene libraries are enriched in DNA encoding an enzyme activity of interest.

14. The method according to claim 13, wherein the enzyme of interest comprises a hydrolase, an oxidoreductase, a transferase, a lyase or a ligase.

15. The method according to claim 14, wherein the enzyme of interest comprises a protease, lipase, beta-galactosidase, lactase, polygalacturonase, beta-glucoamylase, esterase, hemicellulase, peroxidase, oxidase, laccase or glucose oxidase.

16. The method according to claim 14, wherein the enzyme of interest is a pectinase, an amylase, an galactanase, an arabinase, a xylanase or a cellulase.

17. The method of claim 1, wherein the environmental pool of organisms comprises microorganisms.

18. The method of claim 17, wherein the environmental pool of organisms comprises enzyme producing microorganisms.

19. The method of claim 17, wherein the microorganisms comprise Eubacteria, Archaebacteria, fungi, algae and/or protozoa.

20. The method of claim 1, wherein said organisms are enriched cultures.

21. A method of selecting a DNA sequence of interest from an environmental pool of organisms, which method comprises:

a) subjecting the environmental pool of organisms to cultivation in a medium and/or conditions suitable for enriching said pool of organisms in organisms harbouring said DNA sequence;

b) producing gene libraries from the resulting enriched pool of organisms;

c) screening the libraries for DNA containing the desired gene; and

d) selecting the DNA sequence of interest resulting from the screening of step c).

22. A method according to claim 21, wherein the gene library comprises an enzyme-producing gene of interest.

23. The method of claim 21, wherein the gene library is screened for enzymes under conditions which the enzyme is active.

24. The method of claim 21, wherein the gene libraries are screened for pectinase, amylase, galactanase, arabinase, xylanase or cellulase.

25. A gene library prepared from an enriched environmental pool of organisms enriched in DNA encoding a polypeptide with an activity of interest.

26. The gene library according to claim 25, wherein the DNA encoding an polypeptide with an activity of interest comprises an enzyme, a hormone or a toxin.

27. The gene library according to claim 26, wherein the DNA is an enzyme which comprises a pectinase, an amylase, an galactanase, an arabinase, a xylanase or a cellulase.